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Paper

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Filed by: Trial Section Merits Panel
Mail Stop Interferences
P.O. Box 1450
Alexandria, VA 22313-1450
Tel: 703-308-9797
Fax: 703-305-0942

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

DEC 4 - 2003

PAT & T.M. OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

GERARD VAN ENGELEN, CORNELIS D. VAN DIJK,
JOHANNES M. M. VAN KIMMENADE, and JAN VAN EJK

Junior Party,
(Patent 5,844,666),

v.

MARTIN E. LEE,

Senior Party,
(Application 09/449,762).

Patent Interference No. 104,814

Before LEE, LANE, and MEDLEY, Administrative Patent Judges.

MEDLEY, Administrative Patent Judge.

DECISION ON PRELIMINARY MOTIONS AND JUDGMENT

A. Introduction

This interference was declared on April 17, 2002. The interference is related to 104,813.

In this interference, Van Engelen has filed preliminary motions 1 and 2 under Rule 633(a) for

judgment against Lee on the ground that Lee claims 4-6 are unpatentable under 35 U.S.C. § 112, ¶ 1 for lack of written description support for certain claim terms, or alternatively that claims 4-6 are indefinite under 35 U.S.C. § 112, ¶ 2, or that there is no interference-in-fact (Papers 46 and 47). Van Engelen has filed a preliminary motion 3 under 37 CFR § 1.633(a) for judgment against Lee on the ground that Lee claims 4-6 are unpatentable under 35 U.S.C. § 112, ¶ 1 for failing to provide an enabling disclosure for those claims (Paper 48). Through its preliminary motion 8, van Engelen attacks the benefit granted Lee (Paper 53). Van Engelen, through its preliminary motion 6, moves for benefit of an earlier van Engelen European application (Paper 51).

Through its preliminary motion 4, Van Engelen seeks to undesignate its claim 12 and Lee claim 5 from corresponding to the count (Paper 49). Contingent upon the granting of that motion, through its preliminary motion 5, van Engelen seeks to add to the interference a count 2 (Paper 50). Van Engelen moves for benefit of proposed count 2 (Paper 52, preliminary motion 7), and moves to deny Lee benefit of its earlier applications with respect to count 2 (Paper 54, preliminary motion 9). Lee preliminary motions 8 and 12 (Papers 64 and 68) are also ultimately contingent on the granting of van Engelen preliminary motion 4.

Lee filed preliminary motion 6 (Paper 51), for judgment against van Engelen on the ground that van Engelen claim 12 is indefinite under 35 U.S.C. § 112, ¶ 2. Van Engelen filed three responsive motions; miscellaneous motion 10 for entry of a certificate of correction for its claim 12 (Paper 62), preliminary motion 11 to file a reissue application to correct the error in claim 12 (Paper 61 ½), and preliminary motion 12 for benefit of an earlier application for its reissue application (Paper 62 ½).

In Lee preliminary motion 2¹, Lee requests that van Engelen claims 5-9, 13-16, and 18-22 be designated as corresponding to the count (Paper 39). Lee has filed several preliminary motions under 37 CFR § 1.633(a), seeking judgment against van Engelen on the ground that van Engelen's involved claims 1-3 and 10-12, and claims 5-9, 13-16, and 18-22 that Lee seeks to designate as corresponding to the count are unpatentable under 35 U.S.C. §§ 102/103 based on various prior art (Papers 40, 41, and 44). Lee has filed preliminary motion 5 seeking to be accorded the benefit of earlier Lee applications. Lee has filed contingent preliminary motions to (1) add claims 7-9 to its involved application (preliminary motion 9), (2) substitute the count (preliminary motion 10), and (3) be accorded priority benefit as to the new count (preliminary motion 11).

According to the junior party van Engelen's preliminary statement, van Engelen does not allege a date that is earlier than the senior party Lee's effective filing date.

Oral argument was held on 29 April 2003. During oral argument counsel for van Engelen withdrew van Engelen preliminary motion 3 (Paper 129 at 84, line 25 to page 86, line 2).

For the reasons that follow, van Engelen preliminary motions 1, 2, 4, and 8 are denied. Van Engelen preliminary motion 6 is granted. Lee preliminary motion 2 is granted. Van Engelen preliminary motions 3, 5, 7, 9-12, and Lee preliminary motions 3-12 are dismissed, and judgment is entered against van Engelen.

B. Findings of fact

1. Van Engelen is involved on the basis of Patent 5,844,666 ('666), granted 1 December 1998, based on application 08/642,014, filed 2 May 1996.

¹ Lee miscellaneous motion 1 to disqualify van Engelen's counsel was denied (Paper 34).

2. Lee is involved on the basis of application 09/449,762, filed 26 November 1999.
3. Lee has been accorded benefit for the purpose of priority of application 09/192,153, filed 12 November 1998 and application 08/416,558, filed 4 April 1995.
4. Van Engelen real party in interest is ASML Netherlands, B.V.(Paper 9).
5. Lee real party in interest is Nikon Corporation (Paper 4).
6. Count 1, the sole count of the interference, is as follows:

Claim 4 of 09/449,762

or

Claim 10 of 5,844,666

7. Lee claim 4 is as follows:

A lithographic device with a machine frame which, seen parallel to a vertical Z-direction, supports in that order a radiation source, a mask holder, a focusing system with a main axis directed parallel to the Z-direction, and a substrate holder which is displaceable perpendicularly to the Z-direction by means of a positioning device, the positioning device of the substrate holder including an object table and a drive unit by which the object table is displaceable over a guide parallel to at least an X-direction, which guide is fastened to a first frame of the positioning device while a stationary part of the drive unit is fastened to a second frame of the positioning device which is dynamically isolated from the first frame, wherein the first frame of the positioning device of the substrate holder belongs to the machine frame of the lithographic device, while the second frame of the positioning device of the substrate holder belongs to a force frame of the lithographic device which is dynamically isolated from the machine frame; and wherein a reaction force exerted by the object table on the drive unit during operation and arising from a driving force exerted by the drive unit on the object table is transmittable exclusively into the second frame.

8. Claim 10 of van Engelen is as follows:

A lithographic device with a machine frame which, seen parallel to a vertical Z-direction, supports in that order a radiation source, a mask holder, a focusing system with a main axis directed parallel to the Z-direction, and a substrate holder which is displaceable perpendicularly to the Z-direction by means of a positioning device, the positioning device of the substrate holder, including an object table and a drive unit by

which the object table is displaceable over a guide parallel to at least an X-direction, which guide is fastened to a first frame of the positioning device while a stationary part of the drive unit is fastened to a second frame of the positioning device which is dynamically isolated from the first frame, wherein the first frame of the positioning device of the substrate holder belongs to the machine frame of the lithographic device, while the second frame of the positioning device of the substrate holder belongs to a force frame of the lithographic device which is dynamically isolated from the machine frame; and wherein a reaction force exerted by the object table on the drive unit during operation and arising from a driving force exerted by the drive unit on the object table is transmittable exclusively into the second frame.

10. The claims of the parties are:

Van Engelen: 1-22
Lee: 1-6

11. The claims of the parties which correspond to Count 1 are:

Van Engelen: 1-3 and 10-12
Lee: 1-6

12. The claims of the parties which do not correspond to Count 1 are:

Van Engelen: 4-9 and 13-22
Lee: none

9. The level of ordinary skill in the art is defined by the prior art references made of record.

C. Decision

Van Engelen preliminary motions 1 and 2

Van Engelen preliminary motions 1 and 2 are for judgment against Lee on the basis that Lee's claims 4-6 are unpatentable under 35 U.S.C. § 112, ¶ 1, or are indefinite under 35 U.S.C. § 112, ¶ 2, or that there is no interference-in-fact. As the movant van Engelen bears the burden to demonstrate that it is entitled to the relief sought. 37 CFR § 1.637(a).

Written Description

Van Engelen argues that Lee's specification fails to provide support for (1) a second frame that is "dynamically isolated" from a first frame (motion 1), (2) a machine frame which, seen parallel to a vertical Z-direction, supports in that order a radiation source (motion 2) and (3) a stationary part of the drive unit fastened to a second frame (motion 2).

Lee claims 4 and 6 are original claims that were filed the day the involved '762 application was filed. Lee claims 4 and 6 recite all of the limitations that van Engelen asserts are not described in Lee's specification. Lee claim 5 depends from claim 4 and was amended. However, the limitations that van Engelen asserts that the Lee '762 application does not describe are in Lee claims 4 and 6 and not in amended Lee claim 5.

It is well established that original claims, in unamended form are a part of the original specification as filed. See In re Koller, 613 F.2d 819, 823, 204 USPQ 702, 706 (CCPA 1980); In re Gardner, 475 F.2d 1389, 1391, 177 USPQ 396, 397 (CCPA 1973). To the extent that van Engelen is relying on the specification of Lee's parent applications to make the argument that the involved Lee specification does not provide written description support for Lee claims 4-6 under 35 U.S.C. § 112, first paragraph, that is improper. See Reiffin v. Microsoft, 214 F.3d 1342, 1346, 54 USPQ2d 1915, 1918 (Fed. Cir. 2000). Accordingly, that portion of van Engelen's preliminary motions 1 and 2 seeking judgment against Lee on the basis that Lee's involved claims 4-6 lack written description support under 35 U.S.C. §112, ¶ 1 is denied.

Indefiniteness

Van Engelen additionally argues that Lee's claims 4-6 are unpatentable under 35 U.S.C. §112, ¶ 2. Van Engelen argues that should the board determine that Lee's claims 4-6 are

ambiguous, any attempt to resolve the ambiguity only emphasizes the inconsistency between the claim language and the '762 specification (motions 1 and 2 at 15, motion 3 at 17).

Van Engelen makes no real attempt to explain or prove that the involved claims 4-6 are ambiguous in the first place. Van Engelen seems to invite the panel to make an independent determination that the claims are ambiguous. We decline the invitation. It is the role of advocate, not judge, to present a detailed analysis as to why the claims are, on their face, ambiguous. Van Engelen bases the rest of its discussion on a presumption that the claims are ambiguous, and discusses why Lee's involved specification fails to resolve the ambiguity. However, even that analysis is flawed.

Van Engelen argues that Lee's application is devoid of a (1) discussion of how the frames are "dynamically isolated" from one another (motion 1), (2) description of a machine frame which, seen parallel to a vertical Z-direction, supports in that order a radiation source (motion 2), or (3) description of a stationary part of the drive unit fastened to a second frame (motion 2). In essence, Van Engelen argues that Lee's claims 4-6 are not enabled or described, and thus are indefinite. However, the written description requirement and the enablement requirement are separate and distinct from the definiteness requirement. "Definiteness and enablement are analytically distinct requirements." Process Control Corp. v. HydReclaim Corp., 190 F.3d 1350, 1358 n.2, 52 USPQ2d 1029, 1034 n.2 (Fed. Cir. 1999). Even if the written description does not enable the claim, the claim language itself may still be definite. Union Pac. Res. Co. v. Chesapeake Energy Corp., 236 F.3d 684, 692, 57 USPQ2d 1293, 1297 (Fed. Cir. 2001). Since van Engelen has failed to apply the correct standard and sufficiently demonstrate that Lee claims 4-6 are indefinite, this part of van Engelen motions 1 and 2 is denied.

No interference-in-fact

Van Engelen argues that if Lee's claims are definite and are supported by Lee's specification, then there is no interference-in-fact between Lee and van Engelen. Van Engelen, in its preliminary motion 1, page 18, argues that Lee's claims should be interpreted such that the "dynamically isolated" frames are physically isolated frames, which is in contrast with van Engelen's "dynamically isolated" frames which are physically interconnected with a dynamic isolator. Likewise, in its preliminary motion 2, page 23, van Engelen argues that when the van Engelen and Lee claims are interpreted in light of the respective specifications, the parties' claims are limited by their respective specifications, which describe different architecture for the stationary part of the drive unit that is fastened to the second frame (motion 2 at 23). Van Engelen, in interpreting the nearly identical involved claims, proposes to import limitations into the respective parties' claims. The specific structure that van Engelen imports from the respective specifications is not recited in the parties' claims. For example, Lee claims 4 and 6 recite a relationship between two frames - that the frames are dynamically isolated, and not a specific structure, as further discussed *infra*.

In any event, van Engelen fails to sufficiently demonstrate that even if the respective parties' claims require the structure van Engelen urges that they do, that there is no interference-in-fact. Van Engelen argues that "assuming that the '762 application is prior art to the '666 patent, the disclosure in the '762 application does not anticipate or render obvious van Engelen's '666 patent. Likewise, the '666 patent does not anticipate or render obvious the properly construed claims of the '762 application" (motion 1 at 19, motion 2 at 23). Van Engelen's

conclusory statement falls far short from providing a detailed analysis required to demonstrate that there is no interference-in-fact.

Van Engelen must demonstrate that no one claim of Lee claims the same patentable invention as any one claim of van Engelen, or that no one claim of van Engelen claims the same patentable invention as any one claim of Lee.

The definition of "same patentable invention" is set out in 37 CFR § 1.601(n) and is as follows:

Invention "A" is the same patentable invention as an invention "B" when invention "A" is the same as (35 U.S.C. 102) or is obvious (35 U.S.C. 103) in view of invention "B" assuming invention "B" is prior art with respect to invention "A". Invention "A" is a separate patentable invention with respect to invention "B" when invention "A" is new (35 U.S.C. 102) and non-obvious (35 U.S.C. 103) in view of invention "B" assuming invention "B" is prior art with respect to invention "A".

The proper analysis in determining that there is an interference-in-fact between the parties' claims is a two-way "same patentable invention" analysis. The claimed invention of Party A is presumed to be prior art vis-a-vis Party B and vice versa. See Eli Lilly v. Regents of the Univ. Wash., 334 F.3d 1264, 67 USPQ2d 1161 (Fed. Cir. 2003).

The proper analysis then in determining that there is no interference-in-fact between the parties' claims is a one-way analysis. Thus, van Engelen need only demonstrate that (1) no one claim of Lee anticipates or renders obvious a claim of van Engelen or (2) no one claim of van Engelen anticipates or renders obvious a claim of Lee. The moving party should discuss the relevant prior art and explain why the prior art does not teach or suggest the modifications of the one party's claims (e.g., van Engelen's claims) in view of the other party's claims (e.g., Lee's claims).

Van Engelen makes no meaningful attempt to explain why Lee's claims are separately patentable in view of van Engelen's claims or vice versa. It is not enough to point out differences and conclude that there is no interference-in-fact. Nor is it meaningful to argue that one party's specification is separately patentable over the other parties specification, or that one party's claims are separately patentable over the opponents specification. The appropriate comparison is between the claims and not the disclosures. For all of these reasons, van Engelen has failed to sufficiently demonstrate that there is no interference-in-fact. Van Engelen preliminary motions 1 and 2 are denied.

Van Engelen preliminary motion 3

During oral argument, counsel for Van Engelen withdrew van Engelen preliminary motion 3 from consideration (Paper 128 at 84-85). Accordingly, van Engelen preliminary motion 3 is dismissed.

Van Engelen preliminary motion 4

Van Engelen moves to undesignate van Engelen claim 12 and Lee claim 5 from corresponding to the count. Van Engelen claim 12 is reproduced below:

12. A lithographic device as claimed in claim 10, wherein the mask holder is displaceable perpendicularly to the Z-direction by means of said positioning device as claimed in wherein the first frame of the positioning device of the mask holder belongs to the machine frame of the lithographic device, while the second frame of the positioning device of the mask holder belongs to the force frame of the lithographic device.

Lee claim 5 is as follows:

5. A lithographic device as claimed in claim 4, wherein the mask holder is displaceable perpendicularly to the Z-direction by means of a mask holder positioning device that is similar to the positioning device of the substrate holder, and wherein a first frame of the mask holder positioning device belongs to the machine frame of the lithographic device,

while a second frame of the mask holder positioning device belongs to the force frame of the lithographic device.

A party moving to undesignate a claim from corresponding to the count must demonstrate that the claim does not define the same patentable invention as any other claim whose designation in the notice declaring the interference as corresponding to the count the party does not dispute. 37 CFR § 1.637(d)(4)(ii).

As pointed out by van Engelen in its preliminary motion, Lee claim 5 and van Engelen claim 12 are nearly identical, and depend from nearly identical claims 4 and 10 respectively. As Van Engelen's analysis is limited with respect to Lee claim 5, so is ours. In its preliminary motion 4, van Engelen argues that none of the claims render obvious the invention defined by Lee claim 5 (motion at 11). Van Engelen compares Lee claim 5 with Lee claim 4 and Lee claim 6. Specifically, van Engelen argues that neither claim 4, nor claim 6, nor the combination of Lee claim 4 and claim 6 teaches the device recited in claim 5, and then proceeds to discuss the differences between Lee claims 4, 5 and 6. Van Engelen then concludes that since the examiner determined that the count is patentable over the prior art of record, then Lee claim 5 is also patentable over the prior art of record (motion at 13).

It is not enough to assert that there is no teaching in the compared claim that would lead to the claim the party seeks to undesignate, as van Engelen has done here. Absent from the preliminary motion is a demonstration that van Engelen is unaware of any prior art that would render Lee claim 5 obvious in view of Lee claim 4 or Lee claim 6, or if it is aware of prior art that is relevant, that the prior art would not, when combined with Lee claim 4 or Lee claim 6,

render obvious Lee claim 5, all consistent with the moving party's duty of disclosure under 37 CFR § 1.56.

Moreover, van Engelen's argument that since the count is patentable over the prior art of record, then Lee claim 5 is also patentable over the prior art of record, and should therefore be undesignated as corresponding to the count is based on a flawed premise. It does not follow that if the count is patentable over the prior art of record, then the claim van Engelen seeks to undesignate is separately patentable from the count. If that were the test, then no claim would ever be designated as corresponding to a count. The analysis is made with the premise that the claim being compared is prior art. That is the starting point. It is from that point that the analysis is made with respect to obviousness. That is, van Engelen should have demonstrated that given, for example Lee claim 4, that Lee claim 5 would not have been obvious in view of Lee claim 4 and any known prior art.

That analysis would include a discussion of at least those references that would appear to be relevant and that were disclosed in either of Lee's involved application or van Engelen's involved patented file. Van Engelen's discussion centers around the fact that neither Lee claim 4 nor Lee claim 6 teach a mask holder and a substrate holder that are connected, in-part, to a common machine frame and, in-part, to a common force frame as recited in Lee claim 5. Van Engelen argues that claim 5 introduces the concept of a frame shared between the two moving holders (motion at 12). However, at least Isohata² made of record in the involved van Engelen application shows a frame shared between two moving holders. Isohata shows in Fig. 1 a substrate 6 and a mask 5 supported by common frame 7. We make no determination whether it

² U.S. Patent 5,359,389, issued 25 October 1994, filed 13 October 1993.

would have been obvious to employ the Isohata shared frame concept with the system claimed in Lee claim 4 or Lee claim 6. However, as the movant, van Engelen should have at least discussed any prior art, like Isohata, that appears relevant to the analysis. Van Engelen's failure to discuss any prior art known to it, or to allege that it is unaware of any prior art that would render Lee claim 5 obvious, given Lee claim 4 or Lee claim 6 is critical. Without such a discussion, we will not simply imagine or suppose that van Engelen is unaware of any prior art that would render Lee claim 5 obvious in view of Lee claim 4 or Lee claim 6, or that van Engelen is of the opinion that given Lee claim 6 or Lee claim 4 as prior art, that the closest prior art that it is aware of would not render Lee claim 5 obvious. To suppose such a fact would be unfair and prejudicial to the party Lee. Lastly, we note that Lee claim 6 recites "a machine frame which, ... supports ... a mask holder ... and a substrate holder." Lee claim 6 appears to recite the precise feature that van Engelen states is "introduced" in Lee claim 5.

For all of these reasons, van Engelen preliminary motion 4 is denied. Since van Engelen has failed to set forth a *prima facie* case for the relief requested, we need not and have not considered Lee opposition 4.

Van Engelen preliminary motions 5, 7 and 9 and Lee preliminary motions 8 and 12

Van Engelen moves to add a count 2, identical to Lee claim 5, to the interference (preliminary motion 5). Van Engelen moves for benefit of proposed count 2 (preliminary motion 7), and moves to deny Lee the benefit of its earlier filed applications with respect to proposed count 2 (preliminary motion 9). Lee moves to be accorded benefit of van Engelen's proposed count 2 (preliminary motion 8), or its modified count 2 (preliminary motion 12). Van Engelen preliminary motions 5, 7 and 9, and Lee preliminary motions 8 and 12 are ultimately contingent

upon the granting of van Engelen preliminary motion 4 to undesignate van Engelen claim 12 and Lee claim 5 from corresponding to the count. Since Van Engelen preliminary motion 4 is denied, van Engelen preliminary motions 5, 7 and 9, and Lee preliminary motions 8 and 12 are dismissed.

Van Engelen preliminary motion 6

Through its preliminary motion 6, van Engelen moves for benefit of European Application No. 95201409.0 (EP '409), filed 30 May 1995. At the outset, we note that even if van Engelen preliminary motion 6 is granted, that the 30 May 1995 EP '409 application date is subsequent to Lee's benefit date of 4 April 1995. We further note, that in its preliminary statement, the earliest date that van Engelen alleges is 30 May 1995.

The EP '409 application is nearly identical to the involved '666 van Engelen patent. As pointed out by van Engelen in its motion, claim 10 of the EP '409 application is nearly identical to, and describes all of the elements of the count, one alternative of which is van Engelen claim 10. Van Engelen further submits a chart in its discussion. The chart is a comparison between the count and where in the EP '409 application each element of the count is described.

Lee opposes the granting of the motion primarily on the basis that van Engelen failed to attach an appendix (claim chart) to its motion in accordance with § 21 of the Standing Order, and that the certification accompanying the translation of the EP '409 application is fatally flawed. Lee apparently does not oppose the preliminary motion on the merits. For example, Lee is silent with respect to van Engelen's assertion that the translated claim 10 is nearly identical to the count. In response to Lee's opposition, Van Engelen, in its reply, filed a corrected certification and appendix (claim chart).

Van Engelen's preliminary motion is granted. Lee's arguments are based on technicalities, that are not, based on the facts before us, fatal to van Engelen's preliminary motion. Lee does not challenge the accuracy of the translation, but rather challenges the certification of the translation. That the certificate is vague or ambiguous, does not by itself cast doubt on the veracity of the actual translation. Lee has failed to direct us to evidence that would demonstrate that the translation is erroneous. Indeed, Lee does not challenge van Engelen's assertion that the EP '409 claim 10 discloses every element of the count, and thus demonstrates that the EP '409 application describes an enabling embodiment within the scope of the count. Even considering the untranslated EP '409, the figures therein appear identical to the figures in the involved '666 van Engelen patent.

Although Van Engelen fails to attach a claim chart to its preliminary motion, van Engelen discusses in detail in its motion, per a claim chart, how each element of the count is supported. It is of no moment that the claim chart is in the body of the preliminary motion versus being attached to the preliminary motion as an appendix. In any event, van Engelen has submitted into the record, as part of its reply, an appendix with a claim chart, and a corrected certification. Ideally, van Engelen should have complied with the procedures when it filed its preliminary motion. However, Van Engelen's failure to follow the procedures to the "t" is not fatal to it's motion, especially where van Engelen satisfies its burden based on the merits in the first place. For these reasons, van Engelen preliminary motion 6 is granted.

Van Engelen preliminary motion 8

Van Engelen has filed a preliminary motion under Rule 633(g), attacking the benefit

accorded Lee in the notice declaring interference. At the time the interference was declared, Lee was accorded benefit of application 09/192,153 ('153 application), filed 12 November 1998, now U.S. Patent 6,246,202, granted 12 June 2001 and application 08/416,558 ('558 application), filed 4 April 1995, now U.S. Patent 5,874,820, granted 23 February 1999.

Van Engelen argues that Lee is not entitled to the benefit of the earlier filing date of the Lee '558 application, since there is no support for Lee claims 4-6. The '558 application incorporates by reference, Lee application 08/221,375('375). Lee was not accorded priority benefit of the '375 application at the time the interference was declared. We note that Lee has moved to be accorded priority benefit of its '375 application and that motion is addressed *infra* in connection with Lee preliminary motion 5.

Van Engelen argues that the '558 application ineffectively incorporates by reference the '375 application, or alternatively incorporates only a specific portion of the '375 application that fails to describe certain ones of the claimed features in Lee claims 4-6. Alternatively, van Engelen argues that neither the '375 application nor the '558 application, standing alone, provide written description support for Lee's claims.

A party moving to attack the benefit accorded an opponent bears the burden of proof to demonstrate, as to the count, why the opponent should not be accorded the benefit of the filing date of the earlier application. 37 CFR § 1.637(a) and 37 CFR § 1.637(g). Weil v. Fritz, 572 F.2d 856, 865-66 n.16, 196 USPQ 600, 608 n.16 (CCPA 1978); Hunt v. Treppschuh, 523 F.2d 1386, 1389, 187 USPQ 426, 429 (CCPA 1975). In order to be accorded benefit, the '558 application need only describe an enabling embodiment within the scope of the count. Thus, it is not necessary that the '558 application provide written description support for Lee's claims 4-6.

Accordingly, we address van Engelen's arguments only with respect to van Engelen claim 4, which is an alternative of the count.

There is yet another flaw in the arguments advanced by van Engelen. Although van Engelen takes the position that the '558 application fails to provide support for Lee claim 4, with or without incorporating by reference the '375 application, van Engelen fails to discuss the '558 application with particularity with respect to at least one of the features it alleges is not supported in the '558 application. Although Van Engelen discusses the '375 application in detail, the inquiry should begin with what the '558 application describes. That is the application for which Lee was accorded benefit. Until it is determined what the '558 application describes, there is no need to look to the '375 application. The issue of incorporation by reference is moot, if the '558 application alone describes an enabling embodiment within the scope of the count.

Since van Engelen has failed to sufficiently demonstrate, that the '558 application, standing alone, fails to describe an enabling embodiment within the scope of the count we need not determine if the Lee '558 application has effectively incorporated by reference the '375 application, or determine if the '375 application describes an enabling embodiment within the scope of the count. Our discussion pertains to what is set forth in the '558 application and not the '375 application.

Dynamically isolated frames

Lee claim 4 (an alternative of the count) recites a first frame and a second frame. The claim recites that the second frame is dynamically isolated from the first frame. Van Engelen argues that the '558 application fails to describe a second frame that is dynamically isolated from

a first frame (motion at 17). At the heart of van Engelen's argument is the meaning of the term "dynamically isolated."

Van Engelen argues that the '558 application fails to support the broadest reasonable interpretation of "dynamically isolated." The broadest reasonable interpretation of "dynamically isolated", van Engelen argues, comes by way of definition for the terms isolated and dynamically.

Van Engelen argues that:

The term isolated is a verb which means "separate from a group or whole and set apart." (Exh. 2015: Definition, page 956). The term "dynamically" is the adverbial form of the word "dynamic", which is defined as being "[c]haracterized by continuous change, activity, or progress." (Exh. 2016: Definition, page 574). Thus, in the context of the claim language, the term "dynamically" is modifying how the second frame is "isolated" from the first frame. The broadest reasonable meaning of these words *requires* that the second frame be *isolated* from the first frame in a manner that is *characterized by continuous change, activity or progress*.

There is nothing in either the '375 or '558 application that shows such an invention. To the extent that the '375 application or the '558 application discloses separating the reaction frame from the XY stage support frame, that separation is *not* characterized by continuous change, activity or progress but is static, physical isolation. (See Exh. 2012: Kurfess Decl., ¶ 52 (regarding '762 application)). In fact, in the '558 application, Lee explains that reaction forces are transmitted independently to the earth's surface by a structure that is *physically isolated* from the support frame. (Exh. 2032: '558 Appn., page 3, line 27 - page 4, line 11, page 9, lines 7-25; *see also* Exh. 2012: Kurfess Decl., ¶ 48 (regarding '762 application) (emphasis in original) (motion at 15)).

We understand van Engelen's definition of "dynamically isolated" to require that the frames be isolated dynamically - that there necessarily be something in between the two frames that provides the isolation, i.e. that the frames be physically interconnected with dynamic isolators³. Van Engelen does not dispute that the '762 application as well as the '558 specification describe physically separate frames. Van Engelen does, however, disagree that two

³ During oral argument, counsel for van Engelen so represented (Paper 128 at 17-18).

physically separate frames are “dynamically isolated” when applying the broadest reasonable interpretation of that claim term.

Van Engelen’s definition of “dynamically isolated” is derived by viewing the term in light of van Engelen’s specification, resulting in an importation of a structural element that is not part of the count. Van Engelen’s definition for dynamically isolated is not the broadest reasonable interpretation of that term. When the term “dynamically isolated” is properly construed, the Lee ‘558 application provides an enabling embodiment within the scope of the count.

Van Engelen’s proposed definition of dynamic is the second listed definition, and the example for that definition is that of a dynamic market (Ex. 2016). Van Engelen provides no explanation why the term “dynamic” or dynamically should be interpreted under the second listed definition as opposed to the first definition. Note, that Dr. Kurfess, van Engelen’s expert, provides no explanation as to why the proposed second definition is what one of ordinary skill in the art would understand the definition to be (Ex. 2012 ¶ 49). Generally, it is the first listed definition that is the most commonly used definition for a given word. A dynamic market would appear to have nothing to do with two mechanical frames and the relationship between those two frames. Furthermore, van Engelen’s proposed definition would require a structural element between the two frames. Lee’s claim 4, however, does not recite an element for isolating the two frames. Rather, the claim merely recites the relationship between the two frames. The relationship is described by the term dynamically isolated. We will not read limitations into Lee’s claims that would require an element to be in between the two frames. Lee’s claim 4 is not so limiting. Van Engelen’s proposed definition is ultimately obtained by looking to its own specification and importing limitations from its specification into the count. However, the count

is Lee claim 4 or van Engelen claim 10. Each alternative of the count is interpreted in light of the parties' respective involved specifications. The first alternative of the count (Lee claim 4) is interpreted in light of Lee's involved '762 specification.

With that in mind, a more reasonable interpretation of the term "dynamically isolated" may be gleaned from the first definition for the word "dynamic" and from Lee's specification. The first definition for dynamic is "of or relating to energy or to objects in motion" (Ex. 2016). That definition, on its face, is a more reasonable definition for the term dynamic when considered in the context of two frames and their relationship. Lee's '762 specification describes two frames that are isolated from each other, such that the reaction forces from the elements of one frame are not transmitted to the other frame. That is, the dynamics, e.g., motion, from one frame are isolated from the other. In this light, and in view of the first definition for the term dynamic, a more reasonable interpretation of the term dynamically isolated is that the dynamics are isolated from one frame to the other - that the reaction forces from one frame are not transmitted to the other frame. Note, that the proposed definition does not necessarily require structure in between the two frames, but is merely descriptive of the relationship between the two frames. Lee's involved '762 application supports such an interpretation of "dynamically isolated" frames.

For example, the '762 specification states that:

An additional aspect in accordance with the invention is that the reaction force of the stage and window frame drive motors is not transmitted to the support frame of the photolithography apparatus projection lens but is transmitted independently directly to the earth's surface by an independent supporting structure. Thus, the reaction forces caused by movement of the stage do not induce undesirable movement in the projection lens or other elements of the photolithography machine (Ex. 2011 at 3, lines 4-9).

The above indicates that reaction forces, e.g., dynamics of the one frame, are not transmitted to the other frame and are therefore "dynamically isolated." This definition for dynamically isolated, that the reaction forces are isolated, is a more reasonable interpretation of the term "dynamically isolated" given the description in Lee's '762 specification and the first listed definition for dynamic as previously discussed. Van Engelen's definition of "dynamically isolated", in contrast, is derived from van Engelen's involved specification, and by importing an element into Lee's claim 4 that simply is not claimed. To the extent that the second alternative of the count, i.e., van Engelen's claim 10, should be interpreted to mean that there are necessarily "dynamic isolators" in between the two frames does not mean that Lee's claim 4, the first alternative of the count should also be interpreted the same way. The count is the disjunctive alternative of Lee claim 4 and van Engelen claim 10. Lee '558 need only describe an enabling embodiment within the scope of the count, e.g., Lee claim 4. It need not describe an enabling embodiment for both alternatives of the count.

Van Engelen fails to discuss with any particularity what the '558 application describes, and because of that, its argument is not persuasive. However, we note, that the '558 application describes a first frame (80 and 114A-114D), and a second frame (94 and 102A-102D) that are physically isolated, such that reaction forces from one frame are isolated from the other frame. As discussed above, when properly interpreted, the '558 application thus describes two frames that are dynamically isolated. Van Engelen has failed to demonstrate otherwise. Accordingly, we are not persuaded that van Engelen has satisfied its burden of proof to sufficiently demonstrate that Lee's '558 application fails to describe an enabling embodiment within the

scope of the count with respect to two frames that are "dynamically isolated" when that term is correctly interpreted.

A machine frame which ... supports in that order a radiation source

Lee claim 4 recites a machine frame which, seen parallel to a vertical Z-direction, supports in that order a radiation source, a mask holder, a focusing system, etc. Van Engelen's only argument, with respect to the '558 application, is that the illuminator 90 shown in Fig. 2 and Fig. 5, does not indicate that there is any means of support for the illuminator or a description of any particular order for such support with respect to any other element of the illustrated device (motion at 17). Van Engelen fails to sufficiently discuss the remaining '558 application in any manner to make its case.

Lee '558 Fig. 2 shows an illuminator 90 above reticle 24. Central aperture 30, below the reticle allows for the passage of light to the projection lens below. The order of the elements are described throughout the '558 application. (See for example, page 5, lines 22-29). It is clear from the '558 specification that the illuminator 90 is above all of the other elements. That is, when seen parallel to a vertical Z-direction, the radiation source is the first in the order of elements.

The van Engelen '558 specification does not explicitly state that the illuminator is supported by a first frame, i.e., the machine frame. However, when considering the entire '558 specification, it is apparent that the elements shown in the figures must be supported by either one of two frames, and that the radiation source (illuminator) is supported by the machine frame.

As correctly noted by van Engelen, the term "support" means to bear the weight of an object. Thus, the machine frame need only bear the weight of the illuminator. It need not

physically contact the illuminator (radiation source). In the '558 summary of the invention description, it is explained how there are two frames - a support frame (machine frame), for supporting the photolithography apparatus projection lens and associated structures, and a reticle stage mechanism support frame, also referred to as the independent support structure, for supporting the reticle stage drive motors and the window frame drive motors (Ex. 2036 at 3, lines 27-36).

The Lee '558 specification describes the independent support structure 80 as providing the advantage of transmitting reaction forces away from "the frame supporting the other elements of the photolithography apparatus" (emphasis added) (Ex. 2036 at 9, lines 17-21). The support structure 80 is described as supporting the fixed guides 46A, 46B, 64A 64B and the window guide members 40A, ..., 40D. The "other elements of the photolithography apparatus" are supported by the other frame - the machine frame 94. Figure 4 shows the supporting structure for the entire photolithography system. Figure 5 is a side view of Figure 4. Since the illuminator 90, shown in Figure 5, is part of the elements supported by the support structure shown in Figure 4, then illuminator 90 must be supported by either of the two frames shown in Figure 4. Since the specification states that only the reticle stage mechanism is supported by 80, the remaining elements, including illuminator 90 must be supported by 94. Still further, there is no discussion throughout the Lee '558 specification of mounting any of the instruments or components of the disclosed mechanism anywhere other than on the reaction frame or on the support frame.

Van Engelen's sparse discussion of what the '558 specification shows is not sufficient to meet its burden of proving that the '558 specification fails to describe a radiation source that is supported by a (machine) frame. Van Engelen should have discussed the specification in greater

detail and should have discussed what one of ordinary skill in the art would have understood from reading the specification and looking to the figures. Satisfaction of the written description requirement does not require the description of claim terms to be ipsis verbis antecedent in the originally filed application. In re Lukach, 442 F.2d 967, 969, 169 USPQ 795, 796 (CCPA 1971). It is what the specification would have conveyed to one of ordinary skill in the art as to what the inventors possessed at the time of the invention. Based on the record before us, the '558 specification supports a radiation source supported by a machine frame.

A stationary part of the drive unit fastened to the first frame

Lee claim 4 recites a drive unit comprising a stationary part which is fastened to a second frame of the positioning device. Van Engelen argues that Lee '558 fails to provide support for any *stationary* part of the drive unit that is *fastened* to a second frame. Van Engelen provides no meaningful explanation as to why the '558 application fails to describe a stationary part of the drive unit that is fastened to a second frame, and thus has failed to meet its burden to demonstrate that the '558 application fails to describe the claimed feature. Accordingly, we need not independently make the determination as to whether the '558 application does describe a stationary part of a drive unit that is fastened to the second frame.

In any event, we note that the '558 application describes a reticle stage drive unit⁴ that includes X axis linear motors comprised of magnetic tracks 62A and 62B and magnetic coils 60A and 60B and Y axis linear motors comprised of magnetic tracks 70A and 70B and coils 68A

⁴ We recognize that the '558 application describes an embodiment of a reticle drive unit for moving a reticle stage and not a wafer stage drive unit for moving a wafer stage. However, the '558 application states in at least two places that the embodiment described may be used for a wafer stage for processing a wafer (substrate) (Ex. 2036, at 3, lines 21-26 and 5, lines 31-33).

and 68B. The magnetic tracks 70A and 70B are mounted on window frame guide members 40C and 40D respectively. The motor coils 68A and 68B are mounted on the reticle stage 10. The magnetic tracks 62A and 62B are mounted on fixed guides 64A and 64B respectively. The coils 60A and 60B are mounted on guide members 40A and 40B respectively. The guide members 40A-40D and the fixed guide members 64A and 64B are fastened to support structure 80 and 114A-114D (first frame). The drive tracks cooperate with the drive coils to move the reticle stage. At least the drive tracks satisfy the limitation of a stationary part of the drive unit which is fastened to a first frame as follows.

There are two parts to a motor: a stator and a rotor. A stator is defined as the stationary part of a machine, such as a motor, and the rotor is defined as the rotating part (Webster's II New Riverside University Dictionary, Copyright 1988 (definitions attached)). A linear motor is defined as an electric motor that has in effect been split and unrolled into two flat sheets, so that the motion between the rotor and stator is linear rather than rotary. (McGraw-Hill Dictionary of Scientific and Technical Terms - Fifth Edition, copyright 1994 (definition attached)). In the context of a linear motor, the rotor does not rotate, but rather moves in a linear fashion. The stator is that part of the motor which remains stationary relative to the rotor.

Lee describes a linear motor where the stationary parts of the motor, or the stator of the motor is understood to be the X and Y drive tracks. Thus, the '558 application describes a stationary part of the drive unit. Furthermore, the X and Y drive tracks, or stators are attached to the first frame 80, 114A-114D through the guides, and are thus, fastened to the first frame.

From the above, the '558 application describes an enabling embodiment within the scope of the count. Based on the record before us, van Engelen has failed to direct us to evidence that

would demonstrate otherwise. In this regard, van Engelen's silence with respect to the '558 application is fatal to its motion.

Since van Engelen has failed to sufficiently demonstrate that the benefit accorded Lee at the time the interference was declared was in error, we need not consider van Engelen's arguments that its PCT application, WO 96/38767, filed on 5 December 1996 is prior art to Lee. Lee has been accorded the benefit of the '558 application, filed 4 April 1995, which is prior to van Engelen's PCT date.

For all of the above reasons, van Engelen, through its preliminary motion 8, has failed to sufficiently demonstrate that Lee should be denied benefit of the '558 application. Accordingly, van Engelen preliminary motion 8 is denied.

Lee preliminary motion 6 and Van Engelen preliminary motions 10, 11, and 12

An issue in this interference that has generated several preliminary motions, is based on an alleged error in van Engelen claim 12. Van Engelen claim 12, with the alleged error underlined, is as follows:

12. A lithographic device as claimed in claim 10, wherein the mask holder is displaceable perpendicularly to the Z-direction by means of said positioning device as claimed in wherein the first frame of the positioning device of the mask holder belongs to the machine frame of the lithographic device, while the second frame of the positioning device of the mask holder belongs to the force frame of the lithographic device.

Lee seeks judgment against van Engelen on the basis that van Engelen claim 12 is indefinite under 35 U.S.C. § 112, ¶ 2. Van Engelen filed a responsive miscellaneous motion 10 for entry of a certificate of correction, to correct the indefiniteness of its claim 12. Van Engelen also filed a preliminary motion 11 seeking to add to the interference a reissue application, in the

event the certificate of correction was not entered and Lee preliminary motion 6 is granted.

Lastly van Engelen has filed a preliminary motion 12 for benefit of the reissue application.

Van Engelen has failed to allege a date that is earlier than Lee's effective filing date.

Further, van Engelen's preliminary motion 8, attacking the benefit granted Lee is denied.

Accordingly, judgment will be entered against van Engelen. There is then no occasion to consider Lee preliminary motion 6 or van Engelen contingent motions 10, 11, and 12. For these reasons, Lee preliminary motion 6, and van Engelen preliminary motions 10, 11, and 12 are dismissed.

Lee preliminary motion 2

Through its preliminary motion 2, Lee seeks to designate van Engelen claims 5-9, 13-16 and 18-22 as corresponding to the count. Lee discusses van Engelen's claims in five groups of like features as follows: (1) van Engelen claims 5, 13, 15, and 16; (2) van Engelen claims 6 and 7; (3) van Engelen claims 8, 18, and 19; (4) van Engelen claims 9, 20, 21, and 22; and (5) van Engelen claim 14.

Van Engelen claims 5, 13, 15 and 16

Van Engelen claims 5, 13, 15 and 16 relate to a force actuator system. Van Engelen claim 5 depends on van Engelen claim 1. Van Engelen claims 1 and 5 are as follows:

1. A positioning device with an object table and a drive unit by which the object table is displaceable over a guide parallel to at least an X-direction, which guide is fastened to a first frame of the positioning device while a stationary part of the drive unit is fastened to a second frame of the positioning device which is dynamically isolated from the first frame, wherein a reaction force exerted by the object table on the drive unit during operation and arising from a driving force exerted by the drive unit on the object table is transmittable exclusively into the second frame.

5. A positioning device as claimed in claim 1, wherein the positioning device is provided with a force actuator system controlled by an electric control unit and exerting a

compensation force on the first frame during operation, which compensation force has a mechanical moment about a reference point of the first frame having a value equal to a value of a mechanical moment of a force of gravity acting on the object table about said reference point and a direction which is opposed to a direction of the mechanical moment of said force of gravity.

Van Engelen claim 13 depends on van Engelen claim 11. Those claims are as follows:

11. A lithographic device with a machine frame which, seen parallel to a vertical Z-direction, supports in that order a radiation source, a mask holder which is displaceable perpendicularly to the Z-direction by means of a positioning device, a focusing system with a main axis directed parallel to the Z-direction, and a substrate holder which is displaceable perpendicularly to the Z-direction by means of a further positioning device, the positioning device of the mask holder including an object table and a drive unit by which the object table is displaceable over a guide parallel to at least an X-direction, which guide is fastened to a first frame of the positioning device while a stationary part of the drive unit is fastened to a second frame of the positioning device which is dynamically isolated from the first frame, wherein the first frame of the positioning device of the mask holder belongs to the machine frame of the lithographic device, while the second frame of the positioning device of the mask holder belongs to a force frame of the lithographic device which is dynamically isolated from the machine frame; and wherein a reaction force exerted by the object table on the drive unit during operation and arising from a driving force exerted by the drive unit on the object table is transmittable exclusively into the second frame.

13. A lithographic device as claimed in claim 11, wherein the positioning devices of the substrate holder and the mask holder have a joint force actuator system which is controlled by an electric control unit and which exerts a compensation force on the machine frame of the lithographic device during operation which has a mechanical moment about a reference point of the machine frame of a value which is equal to a value of a sum of a mechanical moment of a force of gravity acting on the substrate holder about said reference point and a mechanical moment of a force of gravity acting on the mask holder about said reference point, and a direction which is opposed to a direction of said sum of mechanical moments.

Van Engelen claim 15 depends on van Engelen claim 2, which depends on claim 1. Van Engelen claims 2 and 15 are as follows.

2. A positioning device as claimed in claim 1, wherein the object table is coupled to the stationary part of the drive unit exclusively by a Lorentz force of a magnet system and an electric coil system of the drive unit during operation.

15. A positioning device as claimed in claim 2, wherein the positioning device is provided with a force actuator system controlled by an electric control unit and exerting a compensation force on the first frame during operation, which compensation force has a mechanical moment about a reference point of the first frame having a value equal to a

value of a mechanical moment of a force of gravity acting on the object table about said reference point and a direction which is opposed to a direction of the mechanical moment of said force of gravity.

Van Engelen claim 16 depends on van Engelen claim 3, which depends on claim 2. Van Engelen claims 3 and 16 are as follows.

3. A positioning device as claimed in claim 2, wherein the magnet system and the electric coil system belong to a first linear motor of the drive unit, which drive unit comprises a second linear motor with a stationary part fastened to the second frame and a movable part which is displaceable parallel to the X-direction over a guide of the stationary part, the magnet system of the first linear motor being fastened to the object table and the electric coil system of the first linear motor being fastened to the movable part of the second linear motor.

16. A positioning device as claimed in claim 3, wherein the positioning device is provided with a force actuator system controlled by an electric control unit and exerting a compensation force on the first frame during operation, which compensation force has a mechanical moment about a reference point of the first frame having a value equal to a value of a mechanical moment of a force of gravity acting on the object table about said reference point and a direction which is opposed to a direction of the mechanical moment of said force of gravity.

As the movant, Lee must show that the proposed claims define the same patentable invention as another claim whose designation as corresponding to the count the moving party does not dispute. 37 CFR § 1.637(3)(ii). Lee has sufficiently demonstrated that van Engelen claims 5, 13, 15, and 16 define the same patentable invention as van Engelen claims 1, 2, 3, and 11, or Lee claims 1, 2, 3 and 6 respectively in view of Schutten⁵, without the teachings of Lee '820.

In its opposition, van Engelen's primary discussion is with respect to van Engelen claims 5, 13, 15, and 16. We understand van Engelen's argument to be that since van Engelen claims 5, 13, 15, and 16 do not define the same patentable invention as any other claim designated as corresponding to the count, then neither do those claims that depend on van Engelen claims 5, 13, 15, and 16, i.e., van Engelen claims 6-9, 14, and 18-22.

⁵ U.S. Patent 4,821,205, granted 11 April 1989 (Ex. 1091).

In its opposition, van Engelen argues that since van Engelen claims 1 and 11 require that the first frame and the second frame be dynamically isolated (i.e., isolated with dynamic isolators in between the two frames), and that the force actuator system of van Engelen claims 5, 13, 15, and 16 is defined in van Engelen's specification as being integrated with the dynamic isolators, then the compensation force recited in claims 5, 13, 15 and 16 must be between the two frames and exerted on the first frame (opposition at 15-16).

Van Engelen's claim interpretation is erroneous. Van Engelen necessarily reads limitations into its claims 1 and 11 that are not present. Note, that neither of van Engelen claims 1 and 11 provides any relationship between the function of "dynamically isolated" frames and the force actuator system. Furthermore, as discussed in connection with van Engelen preliminary motion 8, one frame that is "dynamically isolated" from another frame does not mean that there are necessarily dynamic isolators in between the two frames. Van Engelen's independent claims 1 and 11 recite a relationship between the two frames, but do not recite any particular structure associated with that relationship. Even if we were to interpret van Engelen claims 1 and 11 to require dynamic isolators in between the two frames, it does not necessarily follow that the force actuator system must also be in between the two frames. Claims 5, 13, 15, and 16 recite a force actuator system which exerts a compensation force on the first frame (machine frame). Absent from van Engelen claims 5, 13, 15, and 16 is a requirement that the force actuator system be in between the claimed first frame and the second frame (machine frame), or that the force actuator system is integrated with dynamic isolators. All that is required is that the actuator system exert a force on the first frame (machine frame).

Van Engelen argues that Lee's involved specification fails to disclose a compensation force between the first and second frame (opposition at 17). Van Engelen's argument is misplaced. Lee does not rely on its own specification to demonstrate that van Engelen claims 5, 13, 15, and 16 would have been obvious over van Engelen claims 1, 2, 3, and 11 in view of

Schutten. To the extent that van Engelen is arguing that its claims should not be added to the interference since Lee cannot support such a claim, that argument is also rejected. It is of no moment that Lee may or may not have support for a force actuator system. A party moving to designate an opponent's claim as corresponding to the count, need demonstrate that the claim defines the same patentable invention as any one claim designated as corresponding to the count. Absent from that requirement is that the movant must also demonstrate that it has written description support for the opponent's claim. The query is not can the movant support such a claim, but rather does the claim define the same patentable invention as a claim already designated as corresponding to the count.

Van Engelen argues that Lee '820 fails to teach a compensation force between two frames (opposition at 17). As stated above, we do not interpret van Engelen's claims 5, 13, 15, and 16 to require a force actuator system that exerts a compensation force between two frames. In any event, Lee did not rely on the Lee '820 patent to teach a force actuator system that exerts a compensation force between two frames. Rather, Lee alternatively relied on the '820 patent to show an actuator system that compensates for movement of two stages, as opposed to one stage.

Van Engelen argues that Schutten fails to disclose a compensation force between two frames and exerted on a first frame (opposition at 19). As discussed above, when properly construed, van Engelen's claims 5, 13, 15, and 16 do not require that the force actuator system exert a compensation force between two frames. However, even if van Engelen claims 5, 13, 15, and 16 do require a force actuator system that exerts a compensation force between two frames, van Engelen has failed to demonstrate that it would not have been obvious to combine the Schutten actuator system to a two frame system.

Schutten discloses a force actuator system, with force actuators 74, 76 in between the ground and a work table (frame). Thus, Schutten discloses a force actuator in between two structures. Van Engelen has failed to sufficiently demonstrate that one of ordinary skill would

not look to Schutten to teach placing force actuators in between two frames. Specifically, van Engelen fails to explain why Schutten's force actuators would not work in between two frames. Schutten teaches a force actuator system for compensating for forces acting on the frame (stage/table), or for tilting of the frame and for movement of the stage. Based on the record before us, such a system teaches a compensation system regardless of whether that system is placed in between two frames, or in between a frame and the ground. Note, absent from van Engelen's claims 5, 13, 15, and 16 is a requirement that the compensation force compensate for reaction forces in a second frame. Rather the claims recite that the compensation force compensate for forces of gravity acting on the object table (substrate holder/mask holder). Schutten apparently compensates for such forces. Van Engelen has failed to direct us to evidence that demonstrates otherwise.

Van Engelen argues that the prior art fails to disclose a compensation force exerted in response to gravity forces on two moving stages as recited in claim 13 (opposition at 21). Claim 13 recites that the mechanical moments of the forces of gravity for both the mask holder and substrate holder are added in determining the opposing compensation force exerted on the reference frame. Van Engelen argues that Schutten only provides background information and does not teach a compensation force in response to gravity forces exerted on a substrate holder and a mask holder (opposition at 22). Van Engelen's response is dissatisfying.

In its preliminary motion, Lee explains that van Engelen claim 11 recites that the mask holder and the substrate holder are both supported on a common support - the machine frame. The claimed compensation force exerted in van Engelen claim 13 takes into account the sum of all forces acting on that common frame - from both the substrate and mask holders/tables. Lee explains that, although the Schutten reference fails to disclose two stages, Schutten does teach summing all of the forces acting on the supporting frame to arrive at the compensation force. Lee then concludes that one of ordinary skill would have been motivated to use the Schutten

force actuator system to compensate for the forces of both the stages/holders acting on a common frame, since Schutten itself teaches compensating for all forces acting on a common frame.

Van Engelen fails to sufficiently address Lee's argument. That Schutten fails to teach two stages, and an actuator system that compensates for the movement of two stages misses the point. Van Engelen should have explained why Lee's analysis was erroneous. Instead, van Engelen side steps Lee's argument altogether. Accordingly, van Engelen has failed to sufficiently rebut Lee's *prima facie* case with respect to van Engelen claim 13.

Van Engelen's discussion with respect to Schutten's horizontal forcegers is irrelevant. Lee did not rely on the Schutten horizontal forcegers to teach the force actuator system claimed in van Engelen claim 5, 13, 15, and 16.

Van Engelen argues that Lee fails to point to any teaching in the Lee '820 patent of an electronic control unit. Lee's reliance on the '820 patent was in the alternative only. As stated above, Lee made a *prima facie* case based on the van Engelen claims 1, 2, 3, and 11 in view of Schutten without relying on the '820 patent.

For the above reasons, van Engelen has failed to sufficiently rebut Lee's *prima facie* case of obviousness with respect to van Engelen claims 5, 13, 15, and 16.

The remaining van Engelen claims (6-9, 18-22 and 14)

Van Engelen claims 6-9 and 18-22 depend either directly or indirectly from van Engelen claim 5. Van Engelen claim 14 depends from van Engelen claim 13. Lee has sufficiently demonstrated that the van Engelen claims 6 and 7 define the same patentable invention as van Engelen claim 1 or Lee claim 1 in view of Schutten. Lee has also sufficiently demonstrated that van Engelen claims 8, 9 and 18-22 define the same patentable invention as van Engelen claim 1, or Lee claim 1 in view of Schutten and Akutsu⁶. Lastly, van Engelen has sufficiently

⁶ EOP 647 788 B1, published 12 April 1995 (Ex. 1092).

demonstrated that van Engelen claim 14 defines the same patentable invention as van Engelen claim 11, or Lee claim 6, in view of Lee '820, Schutten and Akutsu.

As stated above, van Engelen's arguments are primarily directed to van Engelen claims 5, 13, 15, and 16. Van Engelen does, at the end of its opposition, briefly discuss van Engelen claims 8, 18, and 19. Since van Engelen does not address the specific features of van Engelen claims 6, 7, 9, 14, 20, and 21, van Engelen has failed to sufficiently rebut Lee's *prima facie* case of obviousness with respect to those claims.

1. Van Engelen claims 8, 18, and 19

Van Engelen claim 8 depends on claim 5. Van Engelen claim 18 depends on van Engelen claim 6, and 19 depends on claim 7. Van Engelen claims 8, 18, and 19 are as follows:

8. A positioning device as claimed in claim 5, wherein the force actuator system is integrated with a system of dynamic isolators by means of which the first frame is coupled to a base of the positioning device.

18. A positioning device as claimed in claim 6, wherein the force actuator system is integrated with a system of dynamic isolators by means of which the first frame is coupled to a base of the positioning device.

19. A positioning device as claimed in claim 7, wherein the force actuator system is integrated with a system of dynamic isolators by means of which the first frame is coupled to a base of the positioning device.

Van Engelen argues that, with respect to its claims 8, 18, and 19, Akutsu's linear motor and bellow diaphragm air cylinder do not equate with van Engelen's sophisticated dynamic isolator and integrated force actuator. We understand van Engelen to argue that since its dynamic isolator as disclosed in the '666 patent is of a complex structure, that the Akutsu air cylinder cannot meet the limitation of the "dynamic isolator" recited in van Engelen claims 8, 18, and 19. Van Engelen's argument is not persuasive. Van Engelen claims 8, 18, and 19 recite dynamic isolators. There is no claimed structure associated with the dynamic isolators. Van Engelen suggests that a specific structure be considered when interpreting the term "dynamic

isolator." However, van Engelen has failed to sufficiently demonstrate that the term "dynamic isolator" has a common meaning to one of ordinary skill in the art that would require a structure of something more than a bellow diaphragm air cylinder as taught in Akutsu.

Dr. Kurfess, van Engelen's expert, does not assert that a dynamic isolator, as that term is understood by one of ordinary skill in the art, requires a complex structure other than an air cylinder. Rather, Dr. Kurfess states that, given the complex structure of the dynamic isolator, disclosed in '666, that one of ordinary skill would not have known how to assemble a dynamic isolator and actuator as described in van Engelen's involved '666 patent (Ex. 2042 ¶56). The structure of the dynamic isolator and actuator are not claimed. Furthermore, van Engelen has failed to sufficiently explain why the specific structure of van Engelen's dynamic isolator must be considered in determining obviousness. Claims are to be given their broadest reasonable interpretation. Importing limitations into the claims from the specification is impermissible. For these reasons, van Engelen has failed to sufficiently rebut Lee's *prima facie* case with respect to van Engelen claims 8, 18, and 19.

For all of the reasons discussed above, Lee preliminary motion 2 is granted.

Lee preliminary motions 3, 4 and 7

Lee moves for judgment against van Engelen on the basis that several of van Engelen's claims (including newly added claims 5-9, 13-16, and 18-22) are unpatentable over certain prior art. Van Engelen has failed to allege a date prior to van Engelen's effective filing date. Furthermore, van Engelen's preliminary motion 8 attacking the benefit granted Lee is denied. Accordingly, judgment will be entered against van Engelen. There is then no occasion to consider Lee's preliminary motions for judgment against van Engelen. For these reasons, Lee preliminary motion 3, 4, and 7 are dismissed.

Lee preliminary motion 5

Lee moves for benefit of U.S. Patent Application No. 09/127,288, filed July 31, 1998 (now U.S. Patent 6,049,186); U.S. Patent Application No. 08/627,824, filed April 2, 1996 (now U.S. Patent 5,942,871); and U.S. Patent Application No. 08/221,375, filed April 1, 1994 (now U.S. Patent 5,528,118) with regard to Count 1. Since van Engelen has failed to allege a date that is earlier than the date accorded Lee at the time the interference was declared, and since van Engelen's motion 8, attacking the benefit accorded Lee is denied, judgment will be entered against van Engelen. Accordingly, it is not necessary to determine if Lee should be accorded benefit of the above named applications. Lee preliminary motion 5 is dismissed.

Lee preliminary motion 9

In its preliminary motion 9, Lee proposes to add claims 7-9 to its application and to designate those claims as corresponding to count 1. Lee preliminary motion 9 is contingent upon the granting of van Engelen preliminary motion 2. Since van Engelen preliminary motion 2 is denied, the contingency has not materialized. Accordingly, Lee preliminary motion 9 is dismissed.

Lee preliminary motion 10

Lee moves to substitute new count 1 for existing count 1. The motion is contingent on the granting of van Engelen preliminary motion 8. Since van Engelen preliminary motion 8 is denied, the contingency has not materialized. Accordingly, Lee preliminary motion 10 is dismissed.

Lee preliminary motion 11

Lee moves to be accorded benefit of certain of its prior applications for its proposed count 1. Since the proposed count 1 was not added to the interference, there is no occasion to decide

Lee preliminary motion 11. Accordingly, Lee preliminary motion 11 is dismissed.

Lee motion to suppress

Lee moves to exclude paragraphs 21-24 of exhibit 2042, exhibit 2031, and exhibit 2050.

Lee seeks to exclude paragraphs 21-24 of exhibit 2042, as those paragraphs were relied on by van Engelen in support of van Engelen's opposition 7. Lee preliminary motion 7 was dismissed. Accordingly, there was no occasion to consider van Engelen's opposition 7. Thus, we find it unnecessary to consider the specific objections with respect to exhibit 2042.

Lee moves to suppress exhibit 2031, as being unauthenticated under FRE 901. Exhibit 2031 is a translation of EP '409, an application for which van Engelen sought and was granted the benefit (van Engelen preliminary motion 6). The exhibit 2031 is accompanied by a "translator's verification." Lee objected to the verification as lacking proper authentication due to critical defects in the verification. In response to Lee's arguments in its opposition 6 and objections to van Engelen exhibit 2031, van Engelen filed and served, along with its reply 6, an exhibit 2050, which is a corrected translator's verification. Lee argues that exhibit 2050 should be suppressed as being submitted too late and not in accordance with Standing Order § 34.

We find it unnecessary to consider the specific objections to the admissibility of exhibits 2031 and 2050, since, despite being accorded the benefit of the '409 application, judgment is entered against van Engelen based on priority, even assuming the exhibits to be admissible.

For these reasons, Lee's motion to suppress is dismissed.

D. Redeclaration of Interference

This interference is herein re-declared to the following extent:

1. The parties' claims corresponding to the count are:

Lee: 1-6

Van Engelen: 1-3, 5-16, and 18-22

2. Van Engelen is accorded benefit for the purpose of priority of European Application No. 95201409.0 (EP '409), filed 30 May 1995.

E. Judgment

Junior party van Engelen has not alleged a date of invention or conception with respect to the subject matter of the count prior to the senior party's earliest accorded benefit date of 4 April 1995. Furthermore, van Engelen's preliminary motion 8, attacking the benefit accorded Lee is denied. Accordingly, judgment is entered against junior party van Engelen. It is

ORDERED that judgment as to the subject matter of the count is herein entered against junior party GERARD VAN ENGELEN, CORNELIS D. VAN DIJK, JOHANNES M. M. VAN KIMMENADE, and JAN VAN EIJK;

FURTHER ORDERED junior party GERARD VAN ENGELEN, CORNELIS D. VAN

DIJK, JOHANNES M. M. VAN KIMMENADE, and JAN VAN EJK is not entitled to its claims 1-3, 5-16, and 18-22 which correspond to the count;

FURTHER ORDERED that if there is a settlement agreement, the parties should note the requirements of 35 U.S.C. § 135(c) and 37 CFR § 1.666; and

FURTHER ORDERED that a copy of this judgment be filed in the respective involved application or patent of the parties.

cc (via federal express):

Attorney for Van Engelen:
(Real Party In Interest: ASML Netherlands, B.V.)

Jack S. Barufka (lead counsel)
Robert W. Hahl (backup counsel)
PILLSBURY WINTHROP LLP
1600 Tysons Boulevard
McLean, VA 22102

tel: (703) 905-2000
fax: (703) 905-2500

e-mail: jbarufka@pillsburywintrop.com
rhahl@pillsburywintrop.com

Attorney for Lee:
(Real Party In Interest: Nikon Corporation)

William P. Berridge (lead counsel)
Mario A. Constantino (backup counsel)
Robert Z. Evora (backup)

OLIFF & BERRIDGE, PLC
277 South Washington Street
Suite 500
Alexandria, VA 22314

tel: (703)836-6400
fax: (703)836-2787

e-mail: commcenter@oliff.com

INTERFERENCE DIGEST

Interference No. 104,813

Paper No.15

Name: Martin E. Lee

Serial No.: 09/449,762

Patent No.

Title: Positioning device having dynamically isolated frame, and lithographic device provided with such a positioning device

Filed: 11/26/99

Interference with GERARD VAN ENGELEN , et al.

DECISION ON MOTIONS

Administrative Patent Judge, _____ Dated, _____

FINAL DECISION

Board of Patent Appeals and Interferences, FAVORable Dated, 12/4/03

Court, _____ Dated, _____

REMARKS

This should be placed in each application or patent involved in interference in addition to the interference letters.

A
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C

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Dictionary

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Manufactured in the United States of America

stationary wave • steal

stationary wave *n.* A standing wave.

station break *n.* A pause in a broadcast program to allow for identification of the network or station.

station-er (stāsh'ə-nər) *n.* [ME stacioner < Med. Lat. stationarius, shopkeeper < station, shop < Lat. station.] 1. A seller of stationery. 2. *Obs.* a. A publisher. b. A bookseller.

station-ery (stāsh'ə-nərē) *n.* 1. Writing paper and envelopes. 2. Writing or typing materials.

station house *n.* 1. A police station. 2. A fire station.

station-master (stāsh'ən-mis'tər) *n.* An official in charge of a railroad station.

Stations of the Cross *pl. n.* 1. A devotion that consists of meditation before each of the images or representations set up usu. in a church to commemorate 14 events in the passion of Jesus. 2. The 14 images representing the events of the passion of Christ.

station wagon *n.* An automobile having an extended interior, third seat or luggage platform, and a tailgate.

statistic (stātistik) *n.* [Back-formation < STATISTICS.] 1. A numerical datum. 2. An estimate of a parameter, as of the population mean or variance, obtained from a sample. 3. A random variable that takes on the characteristics of a statistic.

statistic-al (stāt'istik-əl) *adj.* Of, relating to, or using statistics or the principles of statistics. —statistic-ally *adv.*

statistic-i-an (stāt'istik-ən) *n.* 1. A specialist in statistics. 2. One who compiles of statistical data.

statistic-s (stāt'istik-s) *n.* [G. Statistik, political science < NL statisticus, of state affairs < Lat. status, state. —see STATUS.] 1. (sing. in number). The mathematics of the collection, organization, and interpretation of numerical data. 2. (*pl.* in number). A collection of numerical data.

staton *pref.* [*Cf.* status, standing placed.] 1. Resting: remaining. <*stomblast*> 2. Equilibrium: balance <*stomocyst*>

stat-o-blast (stāt'ə-blast') *n.* An asexually produced encapsulated bud of a freshwater bryozoan from which new individuals develop after the parent colony has disintegrated.

stat-o-cyst (stāt'ə-sist') *n.* A small organ of balance in many invertebrates, consisting of a fluid-filled sac containing statoliths that help indicate position when the animal moves.

stat-o-lith (stāt'ə-lith') *n.* A small movable concretion of calcium carbonate found in statocysts.

stat-or (stāt'ər) *n.* [Lat. one that stands < status, p. part of stare, to stand.] The stationary part of a machine, such as a motor, dynamo, or turbine, about which a rotor turns.

stat-o-scope (stāt'ə-skōp') *n.* 1. A barometer for recording small variations in atmospheric pressure. 2. A device for indicating small changes in an airplane's altitude.

stat-u-ary (stāt'ə-erē) *n.* *pl.* *4-ee.* [Partly < Lat. statuaria, art of making statues, and partly < Lat. statuarius, sculptor, both < status, of a statue < status, statue. —see STATUS.] 1. Statues collectively. 2. A sculptor. 3. The art of making statues.

stat-u-ue (stāt'ə-ü) *n.* [ME < OFr. < Lat. status < statuere, to set up. —see STATUS.] A form or likeness sculpted, modeled, carved, or cast in material such as stone, clay, wood, or bronze.

stat-u-ous-que (stāt'ə-ü-äk') *adj.* Like a statue, esp. in size, grace, or dignity: STATUELY. —stat-u-ous-que-ly *adv.*

stat-u-ette (stāt'ə-tät') *n.* A small statue.

stat-u-ure (stāt'ər) *n.* [ME < Of. < Lat. statura < status, p. part of stare, to stand.] 1. The natural height of a human or animal body in an upright position. 2. A level achieved: STATUS.

stat-u-us (stāt'əs, stār'əs) *n.* [Lat. condition, p. part of stare, to stand.] 1. The legal character or condition of a person or thing <the status of a minor>. 2. A stage of progress or development. 3. a. Relative position in a ranked group or in a social system <the high status of physicians>. b. High relative position <a job with status>. 4. A state of affairs: SITUATION.

stat-u-us quo (stāt'əs kwō', stār'əs) *n.* [Lat. state in which.] The existing condition: STATUS OF AFFAIRS.

status word *n.* A computer storage location which provides data to resume an interrupted program.

stat-u-able (stāt'ə-bəl) *adj.* 1. Enacted, regulated, or authorized by statute: STATUTORY. 2. Legally punishable: recognized by statute <a statutable offense>

stat-u-ute (stāt'ə-tü) *n.* [ME < Of. estatut < LLat. statutum < Lat. statutus, p. part of stare, to set up < status, p. part of stare, to stand.] 1. A law enacted by the legislative assembly of a nation or state. 2. A decree or edict. 3. An established law or rule, esp. of a corporation.

statute law *n.* A law established by legislative enactment.

statute mile *n.* *Mile 1.*

statute of limitations *n.* Law. A statute setting a time limit on legal action in certain cases.

statute-ry (stāt'ərē, -örē) *adj.* 1. Of or relating to a statute. 2. Enacted, regulated, or authorized by statute.

statutory offense *n.* A legal offense declared by statute.

statutory rape *n.* Sexual intercourse with a girl who has not reached the statutory age of consent.

staunch¹ (stānch, stānch) *also* **stanch** (stānch, stānch) *adj.* *är-*, *est.* [ME staunch, watertight < OFr. stanche < stanchier, to

staunch. —see STANCH.] 1. Firm and steadfast: *firm*, *staunch*. 2. Having strong construction or constitution. *steiger*: The structure has commonly spelled staunch, but the verb form is more commonly spelled stanch. —staunch² *adv.* —staunch³ *n.*

stauch² (stānch, stānch) *v.* *var.* of STANCH.

stauch³-lite (stānch'-līt') *n.* [*Fr.* < Gk. stauchos, corm] A large black mineral, chiefly $FeAl_2Si_2O_5(OH)_4$, often with coarse grown crystals, occurs used as a gem. —stauch³-relic¹ (*līk*) *n.* A strip of wood forming part of the sides of a container, such as a tub. 2. A rung of a ladder or chair. 3. A staff. 4. A nail or a set of veneers: STANZA. —v. stauched or stauched (*līk*, *līk*) 1. To smash. 2. A set of veneers: STANZA. —v. stauched or stauched (*līk*, *līk*) 1. To break in or puncture the staves (*līk*, *līk*) 2. To smash a hole in. 3. To crush or smash inward. —v. To be broken, crushed in. —stauch off. To keep or ward hold off.

staves-a-cro (stāv'ə-klär) *n.* [By folk ety. < ME staphir, *staphir* a staphylinid, *agris* < Gk. wild raisin] 1. A larva, *Dipteridae*, of a staphylinid of southern Europe, with greenish-white flowers. 2. The young ones of the staphylinid, formerly used externally as a poultice.

stave¹ *n.* [Back-formation < staves, pl. of STAFF.] 1. A staff or tub. 2. A rung of a ladder or chair. 3. A staff. 4. A nail or a set of veneers: STANZA. —v. stauched or stauched (*līk*, *līk*) 1. To smash. 2. A set of veneers: STANZA. —v. stauched or stauched (*līk*, *līk*) 1. To smash a hole in. 3. To crush or smash inward. —v. To be broken, crushed in. —stauch off. To keep or ward hold off.

staves (*stāv'əz*) *n.* *var.* *pl.* of STAFF. 1, 2, 4.

staves-a-cro (stāv'ə-klär) *n.* [By folk ety. < ME staphir, *staphir* a staphylinid, *agris* < Gk. wild raisin] 1. A larva, *Dipteridae*, of a staphylinid of southern Europe, with greenish-white flowers. 2. The young ones of the staphylinid, formerly used externally as a poultice.

stave² *n.* [Back-formation < staves, pl. of STAFF.] 1. A staff or tub. 2. A rung of a ladder or chair. 3. A staff. 4. A nail or a set of veneers: STANZA. —v. stauched or stauched (*līk*, *līk*) 1. To smash. 2. A set of veneers: STANZA. —v. stauched or stauched (*līk*, *līk*) 1. To smash a hole in. 3. To crush or smash inward. —v. To be broken, crushed in. —stauch off. To keep or ward hold off.

stave³ *n.* *var.* *pl.* of STAFF. 1, 2, 4.

staves-a-cro (stāv'ə-klär) *n.* [By folk ety. < ME staphir, *staphir* a staphylinid, *agris* < Gk. wild raisin] 1. A larva, *Dipteridae*, of a staphylinid of southern Europe, with greenish-white flowers. 2. The young ones of the staphylinid, formerly used externally as a poultice.

stave⁴ *n.* [Back-formation < staves, pl. of STAFF.] 1. A staff or tub. 2. A rung of a ladder or chair. 3. A staff. 4. A nail or a set of veneers: STANZA. —v. stauched or stauched (*līk*, *līk*) 1. To smash. 2. A set of veneers: STANZA. —v. stauched or stauched (*līk*, *līk*) 1. To smash a hole in. 3. To crush or smash inward. —v. To be broken, crushed in. —stauch off. To keep or ward hold off.

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staunch⁵⁵ *n.* *var.*

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McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS

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Sybil P. Parker

Editor in Chief

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On the cover: Photomicrograph of crystals of vitamin B₁.
(Dennis Kunkel, University of Hawaii)

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some previously known flow are small compared with the speed of sound; as a result, the equations of motion can be approximated by retaining only those terms which are linear in disturbance or perturbation velocities, pressures, densities, and so forth. ('lin-ē-ər,īz-d,th-ər-əv 'flū-əd,flō)

linear light [NAV] In marine operations, a luminous signal having perceptible length, as contrasted with a point light, which does not have perceptible length. ('lin-ē-ər,īl)

linear - logarithmic intermediate - frequency amplifier [ELECTR] Amplifier used to avoid overload or saturation as a protection against jamming in a radar receiver. ('lin-ē-ər,īl-gār'ith-mik,īn-tər,mē-dē-ət;īn-tē-kwān-sē 'ämp-əl,īfrə)

linearly dependent quantities [MATH] Quantities that satisfy a homogeneous linear equation in which at least one of the coefficients is not zero. ('lin-ē-ər-lē 'pēnd-ənt 'kwān-tə,īlēz)

linearly disjoint extensions [MATH] Two extension fields E and F of a field k contained in a common field L , such that any finite set of elements in E that is linearly independent when E is regarded as a vector space over k remains linearly independent when E is regarded as a vector space over F . ('lin-ē-ər-lē 'dis-joint īk'sten-chanz)

linearly graded junction [ELECTR] A pn junction in which the impurity concentration does not change abruptly from donors to acceptors, but varies smoothly across the junction, and is a linear function of position. ('lin-ē-ər-lē 'grād-ed 'junk-shən)

linearly independent quantities [MATH] Quantities which do not jointly satisfy a homogeneous linear equation unless all coefficients are zero. ('lin-ē-ər-lē 'in-də-pēnd-ənt 'kwān-tə,īlēz)

linearly ordered set [MATH] A set with an ordering \leq such that for any two elements a and b either $a \leq b$ or $b \leq a$. Also known as chain; serially ordered set; simply ordered set. ('lin-ē-ər-lē 'ōr-dərd 'set)

linear magnetic amplifier [ELECTR] A magnetic amplifier employing negative feedback to make its output load voltage a linear function of signal current. ('lin-ē-ər mag'nedrik 'ämp-əl,īfrə)

linear manifold [MATH] A subset of a vector space which is itself a vector space with the induced operations of addition and scalar multiplication. ('lin-ē-ər 'mān-dəl)

linear meter [ENG] A meter in which the deflection of the pointer is proportional to the quantity measured. ('lin-ē-ər 'mē-tər)

linear model [STAT] A mathematical model in which linear equations connect the random variables and the parameters. Also known as linear hypothesis. ('lin-ē-ər 'mād-əl)

linear modulation [COMMUN] Modulation in which the amplitude of the modulation envelope (or the deviation from the resting frequency) is directly proportional to the amplitude of the intelligence signal at all modulation frequencies. ('lin-ē-ər, 'māj-ə-lā-shən)

linear molecule [PHYS CHEM] A molecule whose atoms are arranged so that the bond angle between each is 180° ; an example is carbon dioxide, CO_2 . ('lin-ē-ər 'māl-ə,kyūl)

linear momentum See momentum. ('lin-ē-ər mō'məntəm)

linear motion See rectilinear motion. ('lin-ē-ər mō-shən)

linear motor [ELEC] An electric motor that has in effect been split and unrolled into two flat sheets, so that the motion between rotor and stator is linear rather than rotary. ('lin-ē-ər 'mōd-ər)

linear network [ELEC] A network in which the parameters of resistance, inductance, and capacitance are constant with respect to current or voltage, and in which the voltage or current of sources is independent of or directly proportional to other voltages and currents, or their derivatives, in the network. Also known as linear circuit. ('lin-ē-ər 'net,wrk)

linear operator See linear transformation. ('lin-ē-ər 'ōp-ə,rād-ər)

linear order [MATH] Any order \leq on a set S with the property that for any two elements a and b in S either $a \leq b$ or $b \leq a$. Also known as complete order; simple order; total order. ('lin-ē-ər 'ōr-dər)

linear oscillator See harmonic oscillator. ('lin-ē-ər 'os-ə,lād-ər)

linear parallax See absolute stereoscopic parallax. ('lin-ē-ər 'pār-ə,lāks)

linear parallel texture [PETR] The parallel texture of a rock in which the constituents are parallel to a line, not just to a plane as in plane parallel texture. ('lin-ē-ər 'pār-ə,lel 'tek-schar)

linear-phase [ELECTR] Pertaining to a filter or system whose image phase constant is a linear function of frequency. ('lin-ē-ər,īfāz)

linear polarization [OPTICS] Polarization of an electromagnetic wave in which the electric vector at a fixed point in space remains pointing in a fixed direction, although varying in amplitude. Also known as plane polarization. ('lin-ē-ər,īpō-lā-zā-shən)

linear polymer [ORG CHEM] A polymer whose molecules are arranged in a chainlike fashion with few linkages between the chains. ('lin-ē-ər 'pōl-ə-mēr)

linear power amplifier [ELECTR] A power amplifier in which the signal output voltage is directly proportional to the input voltage. ('lin-ē-ər 'pōw-ər 'ämp-əl,īfrə)

linear programming [MATH] The study of the problem of minimizing a linear function $f(x_1, \dots, x_n)$ subject to constraints which are linear inequalities involving the variables. ('lin-ē-ər 'prō,gram-īj)

linear-quadratic-gaussian problem [CONT SYS] A control problem, containing Gaussian noise, in which the state and measurement equations, in which the value of the quadratic performance index is to be minimized. Abbreviated LQG problem. ('lin-ē-ər,īkō-quadrik,īgāz-yān)

linear rectifier [ELECTR] A rectifier, the output voltage of which contains a wave having a form similar to that of the envelope of an impressed signal. ('rek-tē,īfrə)

linear regression [STAT] The straight line passing through the points of a scatter diagram about which the sum of the squares of the residuals is smallest, as defined, for example, by the least squares method. ('lin-ē-ər,īri-greshən)

linear regulator problem [CONT SYS] A type of control problem in which the system to be controlled is described by linear differential equations and the performance index minimized is the integral of a quadratic function of the state and control functions. Also known as linear control problem; regulator problem. ('lin-ē-ər,īrég-yāl)

linear repeater [ELECTR] A repeater used in communications satellites to amplify input signals a fixed amount. ('lin-ē-ər,īrē-pē-tər)

linear region ('lin-ē-ər nī-pē-dər)

linear scale See uniform scale. ('lin-ē-ər,īskāl)

linear scanning [ENG] Radar beam which moves with constant angular velocity through the scanning sector to complete a complete 360° . ('lin-ē-ər 'skān-ing)

linear space See vector space. ('lin-ē-ər,īspās)

linear speed method [ORD] Method of calculating firing data in which the future position of a projectile is determined by finding the direction of flight and the speed of the target; by multiplying the ground speed of flight of the projectile, the future position is determined. ('lin-ē-ər 'spēd,īmeth-əd)

linear Stark effect [ATOM PHYS] A splitting of the energy levels of hydrogenlike atoms placed in an electric field. The level of principal quantum number n is split into n distinct levels of separation proportional to the field strength. ('lin-ē-ər 'stārk,īfēk-t)

linear stopping power See stopping power. ('lin-ē-ər,īstō-pōr)

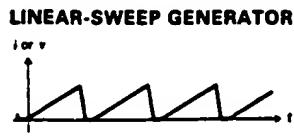
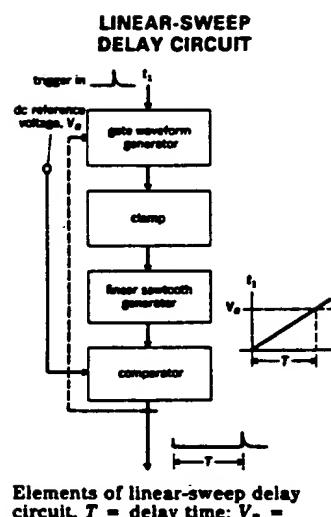
linear strain [MECH] The ratio of the change in length of a body to its initial length. Also known as longitudinal strain. ('lin-ē-ər,īstrān)

linear sweep [ELECTR] A cathode-ray tube in which the beam moves at constant velocity from one side of the screen to the other, then suddenly snaps back to the starting point. ('lin-ē-ər,īswēp)

linear-sweep delay circuit [ELECTR] A variable linear time-delay circuit in which the input signal is processed by a linear sawtooth generator, such as the linear integrator, whose output is then compared with a direct-current reference voltage level. ('lin-ē-ər,īsark-tə)

linear-sweep generator [ELECTR] An electronic circuit that provides a voltage or current that is a linear function of time. The waveform is usually recurrent at uniform intervals. ('lin-ē-ər,īswēp,ījen-ə,rād-ər)

linear system [CONT SYS] A system in which the output



Sawtooth waveform of a linear-sweep generator. Current i or voltage v is plotted against time t .